

Appl. No. 10/825,065
Amdt. dated July 11, 2007
Reply to Office Action of May 17, 2007

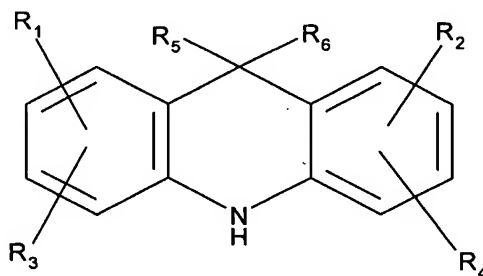
Amendments to the Claims:

Listing of Claims

1. (Currently Amended) A composition comprising:

A) a lubricant; and

B) a mixture of antioxidants, wherein said mixture is prepared by the partial condensation of an alkylated diphenylamine selected from the group consisting of mono-, di-, and tri-nonylated diphenylamine and butylated octylated diphenylamine with an aldehyde or ketone in the presence of an acidic catalyst to yield at least one acridan of the general formula:



along with residual alkylated diphenylamine remaining after said partial condensation;

wherein:

R₁, R₂, R₃, and R₄ are independently selected from the group consisting of hydrogen, ~~C₃ to C₃₂~~
~~alkyl, and C₃ to C₃₂ alkenyl~~ butyl, octyl, and nonyl, provided that at least one of R₁, R₂, R₃,
and R₄ is not hydrogen, and R₅ and R₆ are independently selected from the group consisting of
C₁ to C₂₀ hydrocarbyl and hydrogen;

Appl. No. 10/825,065
Amdt. dated July 11, 2007
Reply to Office Action of May 17, 2007

wherein, at the termination of said condensation, residual alkylated diphenylamine is not separated from the acridan product and remains in said mixture of antioxidants with said acridan.

2 - 4 (Canceled)

5. (Currently Amended) The composition of claim ~~2~~ 1 wherein the alkylated diphenylamine is condensed with a ketone.

6. (Original) The composition of claim 5 wherein the ketone is acetone.

7. (Previously Presented) The composition of claim 1 wherein the composition further comprises at least one antioxidant in addition to that provided by the mixture of acridan and residual alkylated diphenylamine.

8. (Original) The composition of claim 7 wherein the additional antioxidant is selected from the group consisting of amine antioxidants, hindered phenol antioxidants, and mixtures thereof.

9. (Original) The composition of claim 8 wherein the hindered phenol antioxidant is selected from the group consisting of 2,4-dimethyl-6-octyl-phenol; 2,6-di-t-butyl-4-methyl phenol; 2,6-di-t-butyl-4-ethyl phenol; 2,6-di-t-butyl-4-n-butyl phenol; 2,2'-methylenebis(4-methyl-6-t-butyl phenol); 2,2'-methylenebis(4-ethyl-6-t-butyl-phenol); 2,4-dimethyl-6-t-butyl

Appl. No. 10/825,065
Amdt. dated July 11, 2007
Reply to Office Action of May 17, 2007

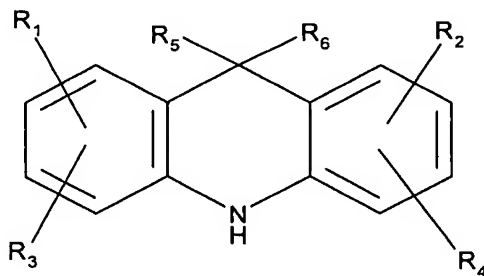
phenol; 4-hydroxymethyl-2,6-di-t-butyl phenol; n-octadecyl-beta(3,5-di-t-butyl-4-hydroxyphenyl)propionate; 2,6-dioctadecyl-4-methyl phenol; 2,4,6-trimethyl phenol; 2,4,6-triisopropyl phenol; 2,4,6-tri-t-butyl phenol; 2-t-butyl-4,6-dimethyl phenol; 2,6-methyl-4-didodecyl phenol; tris(3,5-di-t-butyl-4-hydroxy isocyanurate; tris(2-methyl-4-hydroxy-5-t-butylphenyl)butane; 3,5-di-t-butyl-4-hydroxy hydrocinnamate; octadecyl-3,5-di-t-butyl-4-hydroxy hydrocinnamate; tetrakis{methylene(3,5-di-t-butyl-4-hydroxy-hydrocinnamate)}methane; 1,2-bis(3,5-di-t-butyl-4-hydroxyhydrocinnamoyl)hydrazine; 1,3,5-tris(3,5-di-t-butyl-4-hydroxybenzyl)-s-triazine-2,4,6 (1H,3H,5H)trione; 2,2'-oxamido bis-{ethyl-3-(3,5-di-t-butyl-4-hydroxyphenyl)}propionate; 1,3,5-tris(4-t-butyl-3-hydroxy-2,6-dimethylbenzyl)-s-triazine-2,4,6-(1H,3H,5H)trione; 1,3,5-trimethyl-2,4,6-tris(3,5-di-t-butyl-4-hydroxybenzyl)benzene; 3,5-di-t-butyl-4-hydroxyhydrocinnamic acid triester with 1,3,5-tris(2-hydroxyethyl)-5-triazine-2,4,6(1H,3H,5H)-trione; bis(3,3-bis(4-hydroxy-3-t-butylphenyl)butanoic acid)glycolester; tetrakis{methylene (3,5-di-t-butyl-4-hydroxy-hydrocinnamate)}methane; 1,3,5-trimethyl-2,4,6-tris(3,5-di-t-butyl-4-hydroxybenzyl)benzene; and 3,5-di-t-butyl-4-hydroxy-hydrocinnamic acid C₇-C₉, branched alkyl ester.

10. (Canceled)

11. (Previously Presented) A method for reducing the susceptibility of a lubricant to oxidation comprising adding to said lubricant a mixture of antioxidants, wherein said mixture is prepared by the partial condensation of an alkylated diphenylamine with an

Appl. No. 10/825,065
Amdt. dated July 11, 2007
Reply to Office Action of May 17, 2007

aldehyde or ketone in the presence of an acidic catalyst to yield at least one acridan of the general formula:



along with residual alkylated diphenylamine remaining after said partial condensation;
wherein:

R_1 , R_2 , R_3 , and R_4 are independently selected from the group consisting of hydrogen, C_3 to C_{32} alkyl, and C_3 to C_{32} alkenyl, provided that at least one of R_1 , R_2 , R_3 , and R_4 is not hydrogen, and R_5 and R_6 are independently selected from the group consisting of C_1 to C_{20} hydrocarbyl and hydrogen;

wherein, at the termination of said condensation, residual alkylated diphenylamine is not separated from the acridan product and remains in said mixture of antioxidants with said acridan.

12. (Original) The method of claim 11 wherein the alkylated diphenylamine is selected from the group consisting of mono-, di-, and tri-nonylated diphenylamine and butylated octylated diphenylamine.

Appl. No. 10/825,065
Amdt. dated July 11, 2007
Reply to Office Action of May 17, 2007

13. (Original) The method of claim 11 wherein the alkylated diphenylamine is condensed with a ketone.
14. (Original) The method of claim 13 wherein the ketone is acetone.
15. (Original) The method of claim 12 wherein the alkylated diphenylamine is condensed with a ketone.
16. (Original) The method of claim 15 wherein the ketone is acetone.
17. (Original) The method of claim 11 wherein the composition further comprises at least one antioxidant in addition to that provided by the mixture.
18. (Original) The method of claim 17 wherein the additional antioxidant is selected from the group consisting of amine antioxidants, hindered phenol antioxidants, and mixtures thereof.
19. (Original) The method of claim 18 wherein the hindered phenol antioxidant is selected from the group consisting of 2,4-dimethyl-6-octyl-phenol; 2,6-di-t-butyl-4-methyl phenol; 2,6-di-t-butyl-4-ethyl phenol; 2,6-di-t-butyl-4-n-butyl phenol; 2,2'-methylenebis(4-methyl-6-t-butyl phenol); 2,2'-methylenebis(4-ethyl-6-t-butyl-phenol); 2,4-dimethyl-6-t-butyl phenol; 4-hydroxymethyl-2,6-di-t-butyl phenol; n-octadecyl-beta(3,5-di-t-butyl-4-

Appl. No. 10/825,065
Amdt. dated July 11, 2007
Reply to Office Action of May 17, 2007

hydroxyphenyl)propionate; 2,6-dioctadecyl-4-methyl phenol; 2,4,6-trimethyl phenol; 2,4,6-triisopropyl phenol; 2,4,6-tri-t-butyl phenol; 2-t-butyl-4,6-dimethyl phenol; 2,6-methyl-4-didodecyl phenol; tris(3,5-di-t-butyl-4-hydroxy isocyanurate); tris(2-methyl-4-hydroxy-5-t-butylphenyl)butane; 3,5-di-t-butyl-4-hydroxy hydrocinnamate; octadecyl-3,5-di-t-butyl-4-hydroxy hydrocinnamate; tetrakis{methylene(3,5-di-t-butyl-4-hydroxy-hydrocinnamate)}methane; 1,2-bis(3,5-di-t-butyl-4-hydroxyhydrocinnamoyl)hydrazine; 1,3,5-tris(3,5-di-t-butyl-4-hydroxybenzyl)-s-triazine-2,4,6 (1H,3H,5H)trione; 2,2'-oxamido bis-{ethyl-3-(3,5-di-t-butyl-4-hydroxyphenyl)}propionate; 1,3,5-tris(4-t-butyl-3-hydroxy-2,6-dimethylbenzyl)-s-triazine-2,4,6-(1H,3H,5H)trione; 1,3,5-trimethyl-2,4,6-tris(3,5-di-t-butyl-4-hydroxybenzyl)benzene; 3,5-di-t-butyl-4-hydroxyhydrocinnamic acid triester with 1,3,5-tris(2-hydroxyethyl)-5-triazine-2,4,6(1H,3H,5H)-trione; bis(3,3-bis(4-hydroxy-3-t-butylphenyl)butanoic acid)glycolester; tetrakis{methylene (3,5-di-t-butyl-4-hydroxy-hydrocinnamate)}methane; 1,3,5-trimethyl-2,4,6-tris(3,5-di-t-butyl-4-hydroxybenzyl)benzene; and 3,5-di-t-butyl-4-hydroxy-hydrocinnamic acid C₇-C₉ branched alkyl ester.

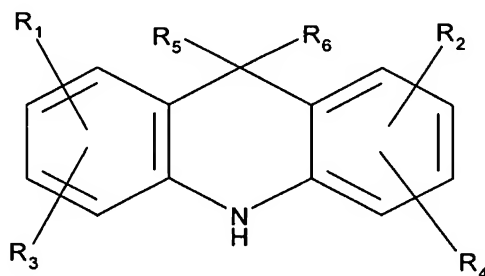
20 - 21 (Canceled)

22. (Previously Presented) A method for reducing the susceptibility of a lubricant to oxidation comprising adding to said lubricant a mixture of antioxidants, wherein said mixture comprises:

Appl. No. 10/825,065
Amdt. dated July 11, 2007
Reply to Office Action of May 17, 2007

(A) a second mixture of antioxidants comprising the products of the partial condensation of an alkylated diphenylamine with an aldehyde or ketone in the presence of an acidic catalyst, wherein said products comprise:

(1) at least one acridan of the general formula:



wherein:

R₁, R₂, R₃, and R₄ are independently selected from the group consisting of hydrogen, C₃ to C₃₂ alkyl, and C₃ to C₃₂ alkenyl, provided that at least one of R₁, R₂, R₃, and R₄ is not hydrogen, and R₅ and R₆ are independently selected from the group consisting of C₁ to C₂₀ hydrocarbyl and hydrogen, and

(2) residual alkylated diphenylamine from the preparation of the acridan;
and

(B) at least one additional antioxidant selected from the group consisting of amine antioxidants, hindered phenol antioxidants, and mixtures thereof.